



U.S. Department of Energy  
Energy Efficiency and Renewable Energy

# DOE Data Center Efficiency

## *Where We Stand and Future Goals*

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*Briefing for*  
DOE Data Center Group Conference Call

*Briefed by*  
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## Potential Benefits of Improved Data Center Energy Efficiency

- **Save 20 billion kWh per year by 2015**
  - Equivocates to savings of nearly \$2 billion
  - About equal to annual electricity use in 1.8 million American homes
- **Potentially defer need to build 2,300 MW of new generating capacity**
  - Avoiding 3.4 million metric tons of carbon emissions
- **Extend life and capacity of existing data center infrastructures**





## Energy Efficiency Goals:

- **E.O. 13423 and EISA 2007**
  - 30% reduction in energy consumption per gross square foot by 2015 (Federal buildings)
- **DOE/Green Grid**
  - 10% more efficient by end of FY 2010 (data centers)

## Operational Goals:

- **Reduce Operating Costs**
- **Improve Security**
- **Improve Reliability**



- Respondents from NNSA, the Office of Science and the Office of Environmental Management
- 46 data centers responded
- 41 had sufficient data to calculate DCIE
- The data centers represent 370,715 square feet (2 did not report square footage)
- More than 51,000 kW



## Based on the survey:

- Increasing DCIE of DOE data centers **10% by 2011** means

*Reducing energy consumption in data centers by about 4845 kW, holding IT energy use constant.*

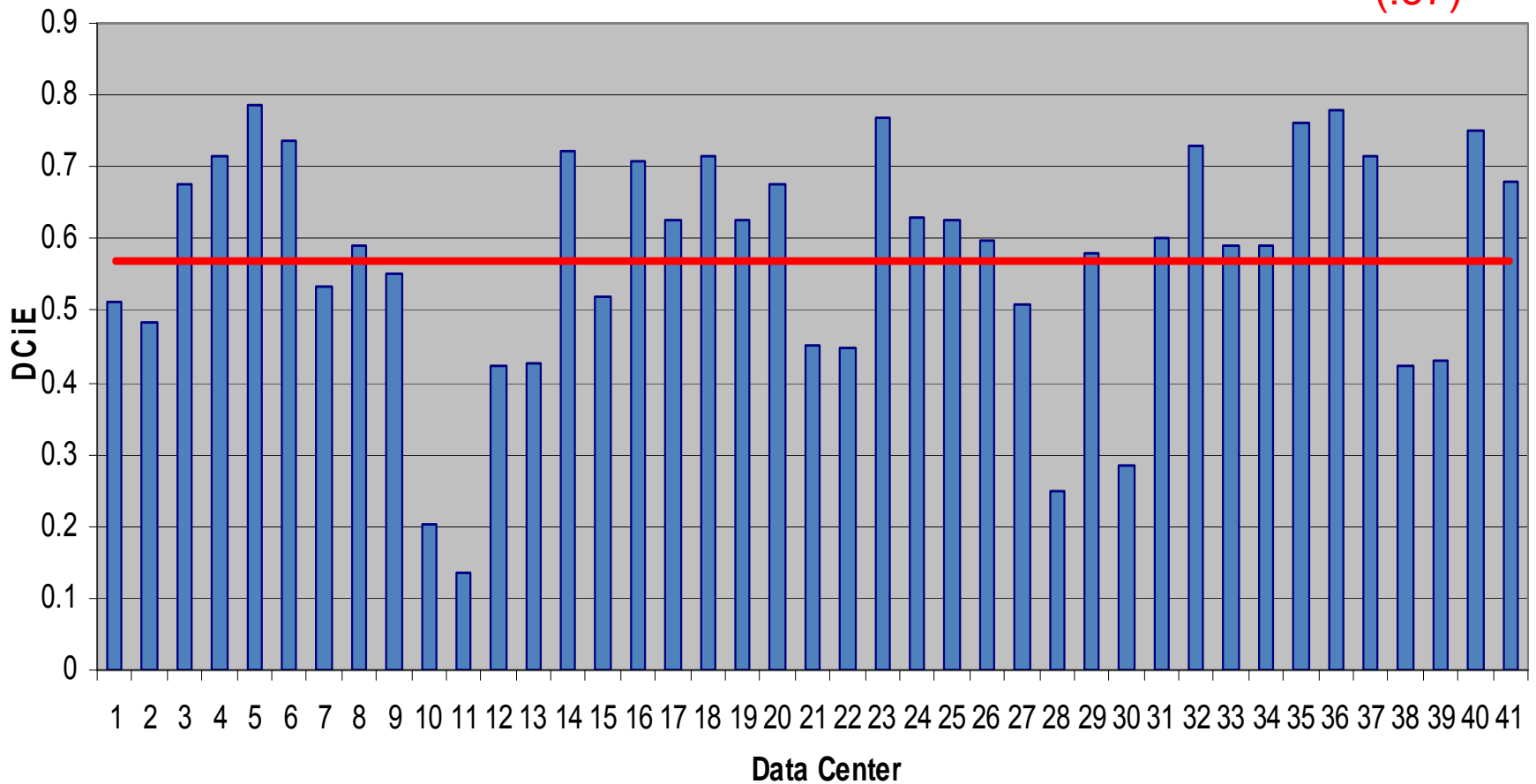
- Decreasing overall kW usage by **10%** means

*Reducing energy consumption by about **5151 kW***



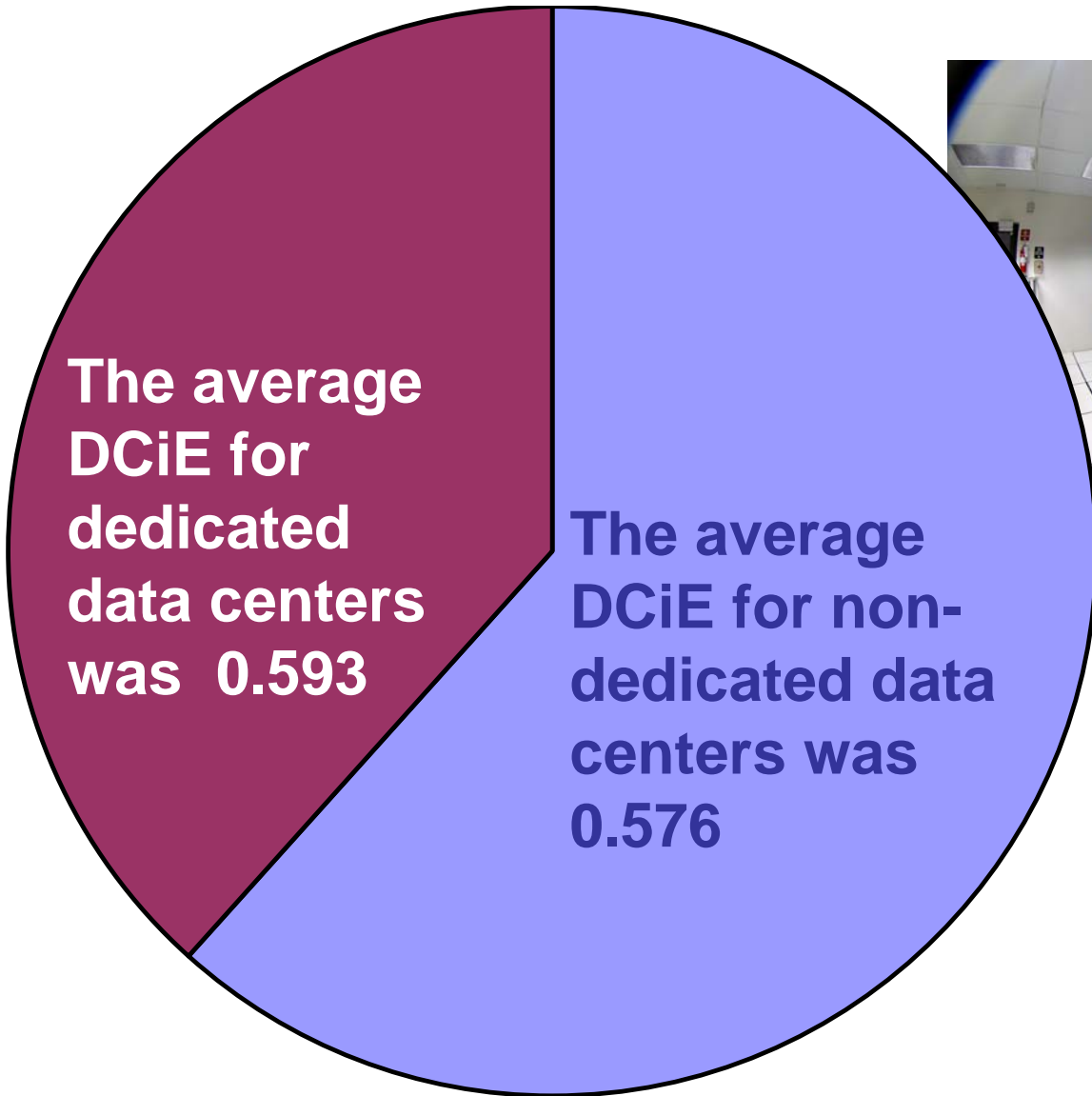
## Data Center Infrastructure Efficiency

Red line  
represents  
average  
(.57)





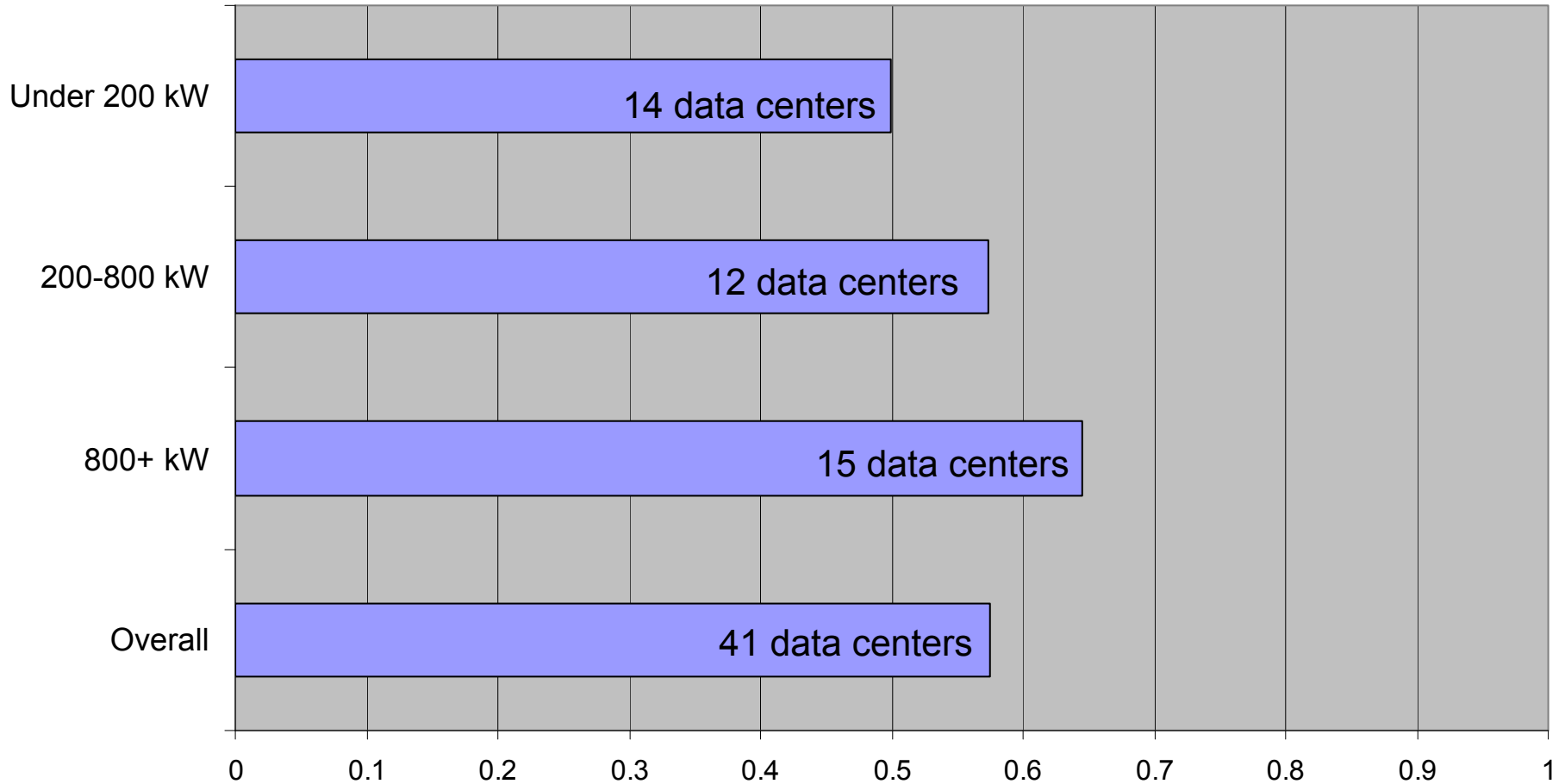
# Dedicated vs. Non-dedicated



- Non-dedicated (24)
- dedicated (17)



# Average DCIE for DOE Data Centers





## *Gather information and target sites:*

- **Pilot DC Pro analysis for three DOE sites**
- **Complete analysis using DC Pro Tool or equivalent**
- **Benchmark**
- **Rank data centers according to greatest potential savings**

## *Identify and Implement*

## *Energy Conservation Measures (ECMs):*

- **Determine appropriate ECMs**
- **Develop DOE, ESPC or UESC and supplier partnerships**
- **Finance ECMs through appropriate financing mechanism**